

RACHEL M. PENCZYKOWSKI

Associate Professor, Department of Biology, Washington University in St. Louis (WashU)
Campus Box 1137, One Brookings Drive, St. Louis, MO 63130 USA
(314) 935-8282 | rpenczykowski@wustl.edu | <https://penczykowskilab.com>
ORCID: 0000-0003-4559-0609

RESEARCH INTERESTS AND APPROACHES

I study effects of environmental change on the ecology and evolution of infectious diseases, and in turn, how diseases affect ecosystems. My research combines theoretical and empirical approaches. Current projects in my lab primarily use common herbaceous plants (*Plantago* spp.) and their fungal (powdery mildew) pathogens as a tractable model system for observing patterns across environmental gradients and testing hypotheses through experiments in the field and lab.

ACADEMIC APPOINTMENTS

Visiting Researcher (sabbatical), University of Helsinki 8/2026–12/2026
--Faculty of Biological and Environmental Sciences

Associate Professor, Washington University in St. Louis 7/2025–Present
--Department of Biology

--Environmental Studies program (courtesy affiliation)

Assistant Professor, Washington University in St. Louis
--Department of Biology 9/2017–6/2025

--Environmental Studies program (courtesy affiliation) 3/2025–6/2025

Graduate program affiliations at Washington University in St. Louis:

Ecology & Evolutionary Biology (EEB) and Plant & Microbial Biosciences (PMB)

Postdoctoral Research Associate 4/2016–8/2017
Department of Integrative Biology, University of Wisconsin, Madison (UW-Madison), WI, USA
Advisor: Anthony R. Ives | arives@wisc.edu

Postdoctoral Researcher 10/2013–4/2016
Metapopulation Research Centre, University of Helsinki, Finland
Advisor: Anna-Liisa Laine | anna-liisa.laine@helsinki.fi

EDUCATION

Ph.D. in Biology; minor: Quantitative Ecology 2008–2013
Georgia Institute of Technology (Georgia Tech), Atlanta, GA, USA
Advisor: Meghan A. Duffy | duffymeg@umich.edu
Dissertation: “Interactions between ecosystems and disease in the plankton of freshwater lakes”

B.S., with Distinction; majors: Biology and Music Performance 2003–2007
University of Wisconsin, Madison, WI, USA
Research Advisor: Stephen R. Carpenter | steve.carpenter@wisc.edu

HONORS AND AWARDS

WashU Provost’s Research Excellence award 2025
National Science Foundation CAREER Award 2023
Best Student Talk Award, Georgia Tech School of Biology retreat 2012
P.E.O. Scholar Award 2012

ACTIVE GRANTS

WashU LEAD with SPEED (\$50,000): Building food resilience by programming plant health. PI: R. Dixit. Co-PIs: X. Zhong and **R. M. Penczykowski** (2026-2027)

WashU Digital Transformation Research Corps (Undergraduate Research Opportunity): Campuses as Labs: building digital infrastructure to unlock biodiversity research and innovative collaborations between universities. **PI: R. M. Penczykowski**. Co-PIs: P. Valko and J. A. Myers. 2026 (10 weeks)

WashU Spark Funding (\$19,974): Urban Wildlife, Climate, and Health Equity in St. Louis: A Proposed Convening Initiative for a New Research Agenda. **PI: R. M. Penczykowski**. 2026

NSF DEB-2304479 (\$722,586): Ecological and evolutionary consequences of climate warming for fungal pathogens. **PI: R. M. Penczykowski**. Co-PI: R. D. Sieg. 2023–2027

NSF DEB-2240087 (\$761,061): CAREER: Climate and connectivity as drivers of pathogen dynamics within and between urban plant populations. **PI: R. M. Penczykowski**. 2023–2027

COMPLETED GRANTS

WashU Nature and Health Alliance pilot grant (\$5000): Health benefits of community garden participation. PI: D. Giammar. **Co-PIs: R. M. Penczykowski** and L. Iannotti. 2025–2026

Taylor Geospatial Institute GISCoR Seed Grant (\$200,000): Integrating downscaled climate models with in-situ measurements to investigate fine-scale urban environmental heterogeneity. **PIs: R. M. Penczykowski** and K. A. Medley; Co-PIs: F. Sun and R. Michaelides. 2023–2025

Tyson Faculty Seed Grant for Interdisciplinary Research (\$20,000): Electromechanical Design for Ecological Research. PI: J. J. Potter. **Co-PI: R. M. Penczykowski**. 2020–2021

Tyson Faculty Seed Grant for Interdisciplinary Research (\$20,000): Effects of a fungal foliar pathogen on nutrient dynamics in a model food web. **PI: R. M. Penczykowski**. Co-PIs: D. A. Fike and A. M. Koltz. 2018–2021

Living Earth Collaborative (\$22,775; working group): Quantifying effects of parasites on ecosystem nutrient cycling. PI: A. M. Koltz. **Co-PIs: R. M. Penczykowski**, V. O. Ezenwa, S. L. Deem. 2018–2021

InCEES (\$30,000): Does climate change affect the interplay between soil microbes and aboveground plant enemies? PI: S. A. Mangan. **Co-PIs: R. M. Penczykowski** and C. Stein. 2017–2021

FELLOWSHIPS

National Science Foundation Graduate Research Fellowship	2010–2013
Georgia Tech President's Fellowship	2008–2012

PUBLICATIONS

Current & former members of my group are indicated as: ^Uundergraduate student; ^Ggraduate student; ^Ppostdoc; ^Ttechnician.

39. Buckley Y., A. Finn, A. Molloy, A. Csergő, E. Crone, A. Smith, B. Elder, C. McKeon, D. Roach, D. Childs, G. Wardle, M. Garcia, M. Baudraz, **R. M. Penczykowski**, R. Salguero-Gómez, R. Kelly, S. Ramula, A.-L. Laine, S. Blomberg, J. Ehrlén, J. Villellas, A. Helm, C. Roscher, K. Raveala, L. Hamre, L. Korell, F. Brearley, S. Olsen, A. Wingler, J. Moore, A. Tack, A. Bucharova, O. Skarpaas, J. Bodis, A. Compagnoni, S. Munné-Bosch, Z. Münzbergová, J. Töpper, P. Vesk, M. Morales, E. Wandrag, M. Saastamoinen, M. Andrzejak, P. Rasmussen, C. Caruso, R. Duncan, J. Dwyer, M. Coghill, R. Groenteman, M.

- Partel, W. Petry, M. Lonati, J. Puy, J. Catford, T. Drees, C. Rosche, K. Shea, S. Ravetto Enri, J. Gremer, B. Deák, L. Fraser, L. Laanisto, O. Valkó, R. D. Sieg, B. Bachelot, J. Firm. Quality Assurance framework for the design, collection and curation of Standard Data Products from a distributed ecology network. Accepted at *Ecology and Evolution*.
38. **Penczykowski, R. M.**, R. Stam, F. W. Halliday, and E. L. Bruns. 2026. Bridging plant pathology and disease ecology: emerging insights into wild plant–pathogen systems. *Phil Trans R Soc B*, 381:20250107.
 37. Tanford, P.^G, R. C. Vargas, M. Bugay^G, G. Dantas, C. Stein, **R. M. Penczykowski**, and S. A. Mangan. 2026. Foliar pathogens and drought drive plant–soil feedback between two wild herbs. *Phil Trans R Soc B*, 381:20250115. (co-senior authors)
 36. Arnold, K. M. H.^P, M. J. Bugay^G, Q. N. Fox^G, C. M. Morris^G, W. D. Hutson, A. Durant, A. V. Basta, C. P. Tomera, S. E. Pierce, G. Z. Armstrong, D. Chen, D. J. Chertow, R. L. Hofstra, C. Johnson, K. Talbert, K. R. Wallace, A. Wassel, and **R. M. Penczykowski**. 2026. Impacts of urbanization on pathogens and pests of wild and cultivated plants. *Phil Trans R Soc B*, 381:20250111. (authors Hutson–Wassel were students in my Disease Ecology course)
 35. Baudraz, M., D. Z. Childs, R. Kelly, A. L. Smith, J. Villellas, M. Andrzejak, B. Bachelot, L. K. Benedek, S. P. Blomberg, J. Bodis, F. Q. Brearley, A. Bucharova, C. M. Caruso, J. A. Catford, M. Coghill, A. Compagnoni, A. M. P. Csörgő, R. P. Duncan, J. Dwyer, J. Ehrlén, B. D. Elderd, A. Finn, L. Fraser, M. B. García, J. R. Gremer, R. Groenteman, L. N. Hamre, A. Helm, M. Höhn, L. Korell, L. Laanisto, A.-L. Laine, M. Lonati, C. M. McKeon, A. Molloy, J. L. Moore, M. Morales, S. Munne-Bosch, Z. Münzbergová, S. L. Olsen, A. Oprea, M. Pärtel, **R. M. Penczykowski**, W. K. Petry, S. Ramula, P. U. Rasmussen, S. R. Enri, D. A. Roach, A. Roeder, C. Roscher, M. Saastamoinen, C. Schultz, R. D. Sieg, O. Skarpaas, A. J. M. Tack, J. Töpper, P. A. Vesk, G. Vose, E. M. Wandrag, G. M. Wardle, A. Wingler, and Y. M. Buckley. 2025. Several candidate size metrics explain vital rates across multiple populations throughout a widespread species' range. *Journal of Ecology*, 113:3159–3176.
 34. Fogel, N. S.^P and **R. M. Penczykowski**. 2025. Belowground sensors capture spatiotemporal variation in urban heat island effect. *Urban Ecosystems*, 28:81.
 33. De Frenne, P., R. Beugnon, D. Klingses, J. Lenoir, P. Niittynen, S. Pincebourde, R. A. Senior, J. Aalto, K. Chytrý, P. Gillingham, C. Greiser, E. Gril, S. Haesen, M. Kearney, M. Kopecký, P. C. le Roux, M. Luoto, I. Maclean, M. Man, **R. M. Penczykowski**, L. van den Brink, S. Van de Vondel, K. De Pauw, J. J. Lembrechts, J. Kemppinen, K. Van Meerbeek. 2025. Ten practical guidelines for microclimate monitoring in terrestrial ecosystems. *Methods in Ecology & Evolution*, 16:269–294.
 32. Fox, Q. N.^G, K. N. Farah^U, O. S. Shaw^U, M. Pollowitz^U, A. Sánchez-Conde^U, C. Goodson^T, and **R. M. Penczykowski**. 2024. Effects of microclimate on disease prevalence across an urbanization gradient. *Ecology*, 105:e4313.
 31. **Penczykowski, R. M.**, M. L. Fearon, J. L. Hite, M. S. Shocket, S. R. Hall, and M. A. Duffy. 2024. Pathways linking nutrient enrichment, habitat structure, and parasitism to host–resource interactions. *Oecologia*, 204:439–449.
 30. Robinson, M. L. and HerbVar consortium [>100 authors including **R. M. Penczykowski**, Q. N. Fox^G, and K. Farah^U]. 2023. Plant size, latitude, and phylogeny explain within-population variability in herbivory. *Science*, 382:679–683.
 29. Sieg, R. D., J. K. Hubbard, **R. M. Penczykowski**, M. Williard, and Z. A. Dwyer. 2023. A novel course-based experience to promote ecological field skills during the COVID-19 pandemic. *Science Education and Civic Engagement: An International Journal*, 15:31–41.
 28. Koltz, A. M., D. J. Civitello, D. J. Becker, S. L. Deem, A. T. Classen, B. T. Barton, M. Brenn-White, Z. E. Johnson, S. Kutz, M. Malishev, D. L. Preston, J. T. Vannatta, **R. M.**

- Penczykowski**, and V. O. Ezenwa. 2022. Sublethal effects of parasitism on ruminants can have cascading consequences for ecosystems. *PNAS*, 119:e2117381119. (co-senior authors)
27. Lembrechts, J. J., J. van den Hoogen, SoilTemp consortium [>400 authors including **R. M. Penczykowski**], et al. 2022. Global maps of soil temperature. *Global Change Biology*, 28:3110–3144.
 26. **Penczykowski**, **R. M.**, S. R. Hall, M. S. Shocket, J. Housley Ochs, B. C. P. Lemanski, H. Sundar, and M. A. Duffy. 2022. Virulent disease epidemics can increase host density by depressing foraging of hosts. *American Naturalist*, 199:75–90.
 25. Potter, J. J., S. Tan, and **R. M. Penczykowski**. 2021. Robotany: a portable, low-cost platform for precise automated aerial imaging of field plots. *Methods in Ecology & Evolution*, 12:1860–1866.
 24. **Penczykowski**, **R. M.** and R. D. Sieg. 2021. *Plantago* spp. as models for studying the ecology and evolution of species interactions across environmental gradients. *American Naturalist*, 198:158–176.
 23. Duffy, M. A., C. Garcia-Robledo, S. Gordon, N. A. Grant, D. A. Green II, A. Kamath, **R. M. Penczykowski**, M. Rebolleda Gómez, N. Wale, and L. Zaman. 2021. Model systems in ecology, evolutionary, and behavior: A call for diversity in our model systems and discipline. *American Naturalist*, 198:53–68.
 22. Ezenwa, V. O., D. J. Civitello, A. T. Classen, B. T. Barton, D. J. Becker, M. Brenn-White, S. L. Deem, S. Kutz, M. Malishev, **R. M. Penczykowski**, D. L. Preston, J. T. Vannatta, and A. M. Koltz. 2021. Response to Charlier et al.: Climate-disease feedbacks mediated by livestock methane emissions are plausible. *Trends in Ecology & Evolution*, 36:578–579.
 21. Ezenwa, V. O., D. J. Civitello, B. T. Barton, D. J. Becker, M. Brenn-White, A. T. Classen, S. L. Deem, Z. E. Johnson, S. Kutz, M. Malishev, **R. M. Penczykowski**, D. L. Preston, J. T. Vannatta, A. M. Koltz. 2020. Infectious diseases, livestock, and climate: a vicious cycle? *Trends in Ecology & Evolution*, 35:959–962.
 20. Halliday, F. W., **R. M. Penczykowski**, B. Barrès, J. L. Eck, E. Numminen, and A.-L. Laine. 2020. Facilitative priority effects drive pathogen community assembly in a wild-plant pathosystem. *Nature Ecology & Evolution*, 4:1510–1521. (co-first/co-corresponding authors)
 19. Ives, A. R., B. T. Barton, **R. M. Penczykowski**, J. P. Harmon, K. L. Kim, K. Oliver, and V. C. Radeloff. 2020. Self-perpetuating ecological-evolutionary dynamics in an agricultural host-parasite system. *Nature Ecology & Evolution*, 4:702–711.
 18. **Penczykowski**, **R. M.**, S. R. Parratt, B. Barrès, S. K. Sallinen, and A-L Laine. 2018. Manipulating host resistance structure reveals impact of pathogen dispersal and environmental heterogeneity on epidemics. *Ecology*, 99:2853–2863.
 17. Hite, J. L., **R. M. Penczykowski**, M. S. Shocket, K. Griebel, A. T. Strauss, M. A. Duffy, C. E. Cáceres, and S. R. Hall. 2017. Allocation, not male resistance, increases male frequency during epidemics: a case study in facultatively sexual hosts. *Ecology*, 98:2773–2783.
 16. **Penczykowski**, **R. M.**, B. M. Connolly, and B. T. Barton. 2017. Winter is changing: trophic interactions under altered snow regimes. *Food Webs*, 13:80–91.
 15. Parratt, S. R., B. Barrés, **R. M. Penczykowski**, and A-L Laine. 2017. Local adaptation at higher trophic levels: Contrasting hyperparasite-pathogen infection dynamics in the field and laboratory. *Molecular Ecology*, 26:1964–1979.
 14. Strauss, A. T., M. S. Shocket, D. J. Civitello, J. L. Hite, **R. M. Penczykowski**, M. A. Duffy, C. E. Cáceres, and S. R. Hall. 2016. Habitat, predators, and hosts regulate disease in *Daphnia* through direct and indirect pathways. *Ecological Monographs*, 86:393–411.
 13. Hite, J. L., **R. M. Penczykowski**, M. S. Shocket, A. T. Strauss, P. A. Orlando, M. A. Duffy, C. E. Cáceres, and S. R. Hall. 2016. Parasites destabilize host populations by shifting stage-structured interactions. *Ecology*, 97:439–449.

12. **Penczykowski, R. M.**, A-L Laine, and B. Koskella. 2016. Understanding the ecology and evolution of host–parasite interactions across scales. *Evolutionary Applications*, 9:37–52.
11. Civitello, D. J., **R. M. Penczykowski**, A. Smith, M. S. Shocket, M. A. Duffy, and S. R. Hall. 2015. Resources, key traits, and the size of fungal epidemics in *Daphnia* populations. *Journal of Animal Ecology*, 84:1010–1017.
10. **Penczykowski, R. M.**, E. Walker, S. Soubeyrand, and A-L Laine. 2015. Linking winter conditions to regional disease dynamics in a wild plant-pathogen metapopulation. *New Phytologist*, 205:1142–1152.
9. **Penczykowski, R. M.**, B. C. P. Lemanski, R. D. Sieg, S. R. Hall, J. Housley Ochs, J. Kubanek, and M. A. Duffy. 2014. Poor resource quality lowers transmission potential by changing foraging behaviour. *Functional Ecology*, 28:1245–1255.
8. **Penczykowski, R. M.**, S. R. Hall, D. J. Civitello, and M. A. Duffy. 2014. Habitat structure and ecological drivers of disease. *Limnology & Oceanography*, 59:340–348.
7. Auld, S. K. J. R., **R. M. Penczykowski**, J. Housley Ochs, D. C. Grippi, S. R. Hall, and M. A. Duffy. 2013. Variation in costs of parasite resistance among natural host populations. *Journal of Evolutionary Biology*, 26:2479–2486.
6. Civitello, D. J., **R. M. Penczykowski**, J. L. Hite, M. A. Duffy, and S. R. Hall. 2013. Potassium stimulates fungal epidemics in *Daphnia* by increasing host and parasite reproduction. *Ecology*, 94:380–388.
5. Duffy, M. A., J. Housley Ochs, **R. M. Penczykowski**, D. J. Civitello, C. A. Klausmeier, and S. R. Hall. 2012. Ecological context influences epidemic size and parasite-driven evolution. *Science*, 335:1636–1638.
4. Duffy, M. A., J. M. Housley, **R. M. Penczykowski**, C. E. Cáceres, and S. R. Hall. 2011. Unhealthy herds: indirect effects of predators enhance two drivers of disease spread. *Functional Ecology*, 25:945–953.
3. Thomas, S. H., J. M. Housley, A. N. Reynolds, **R. M. Penczykowski**, K. H. Kenline, N. Hardege, S. Schmidt, and M. A. Duffy. 2011. The ecology and phylogeny of oomycete infections in *Asplanchna* rotifers. *Freshwater Biology*, 56:384–394.
2. **Penczykowski, R. M.**, S. E. Forde, and M. A. Duffy. 2011. Rapid evolution as a possible constraint on emerging infectious diseases. *Freshwater Biology*, 56:689–704.
1. Kamarainen, A. M., **R. M. Penczykowski**, M. C. Van de Bogert, P. C. Hanson, and S. R. Carpenter. 2009. Phosphorus sources and demand during summer in a eutrophic lake. *Aquatic Sciences*, 71:214–227.

Manuscripts in review

- Fischer, G. A., G. Abney, **R. M. Penczykowski**, and J. B. Losos. From integration to regeneration: feedback architectures for sustainable urban futures. In review at *One Earth*.
- Fogel, N.^P, K. M. Westby, Y. Zhang, K. A. Medley, and **R. M. Penczykowski**. Ecological relevance of microclimate variation in vegetated habitats across an urbanization gradient. Submitted to *Ecosphere*.

INVITED PRESENTATIONS

Department seminars

- Sept 2026: Organismal and Evolutionary Biology seminar series, University of Helsinki, Finland
- 2025: Ecology and Evolutionary Biology Seminar Series, University of Michigan, Ann Arbor, MI
- 2024: Department of Biology, Washington University in St. Louis, St. Louis, MO
- 2024: Systematics, Ecology, and Evolution Division, Louisiana State University, Baton Rouge, LA
- 2023: Center for Infectious Disease Dynamics, Penn State University, State College, PA

2021: Disease Evolutionary Ecology Group, Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany (Zoom)

2021: Ecology, Evolution, and Behavior Group, Department of Biology, University of Maryland, College Park, MD (Zoom)

2021: Biology Department, University of Missouri - St. Louis, St. Louis, MO (Zoom)

2020: Department of Biology, Washington University in St. Louis, St. Louis, MO (Zoom)

2020: Ecology and Evolution of Infectious Disease Seminar Series, University of California, Berkeley, Berkeley, CA (Zoom)

2019: Department of Biological Sciences, Purdue University, West Lafayette, IN

2019: Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA

2019: Department of Biology, St. Louis University, St. Louis, MO

2018: Donald Danforth Plant Science Center, St. Louis, MO

2018: Department of Biological Sciences, Southern Illinois University Edwardsville, Edwardsville, IL

2018: School of Biological Sciences, University of Nebraska, Lincoln, NE

2018: Bioforum, Department of Biology, Washington University, St. Louis, MO

2017: Departments of Zoology and Botany, University of Wisconsin - Madison, Madison, WI

2016: Department of Biology, Washington University in St. Louis, St. Louis, MO

2015: Department of Biological Sciences, University of Alabama, Tuscaloosa, AL

2015: Biological Sciences Department, Dartmouth University, Hanover, NH

2015: Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN

2014: Department of Plant Pathology, University of Wisconsin-Madison, Madison, WI

2014: Department of Ecology and Evolutionary Biology, University of Helsinki, Finland

2008: Center for Limnology, University of Wisconsin-Madison, Madison, WI

Scientific meetings and symposia (presenting author)

Nov 2026: Jacques Monod Conference on “Ecology and evolution of host-parasite interactions in a changing world” (Roscoff, France)

2026: Ecology and Evolution of Infectious Diseases annual meeting, Blacksburg, VA (**keynote**)

2025: PlantPopNet Symposium (virtual)

2025: 2nd Making Saint Louis the Nature City of the 21st Century Symposium, St. Louis, MO

2025: Ecological Society of America, Baltimore, MD (poster)

2025: Symposium “Plant-microbe biodiversity under global change”, Helsinki, Finland

2024: Wild Plant Pathosystems, Kiel, Germany (**keynote**)

2023: Ecological Society of America, Organized Oral Session "Plant Disease Ecology: From Individuals to Landscapes", Portland, OR

2023: Urban Biodiversity Symposium, St. Louis, MO

2023: Taylor Geospatial Institute Research Day, St. Louis, MO

2021: Ecological Society of America, Inspire Session "Infectious lessons: teaching disease ecology" (pre-recorded talk with live discussion)

2021: American Society of Naturalists Vice Presidential Symposium, Virtual Asilomar (Zoom)

2019: Wild Plant Pathosystems, Frankfurt, Germany

2019: Ecological Society of America, Organized Symposium "Crossing the Taxonomic Divide in Disease Ecology", Louisville, KY

2019: St. Louis Plant-Microbe and Microbiome Meetup Event, St. Louis, MO

2018: Ecological Society of America, New Orleans, LA

2017: St. Louis Ecology, Evolution, and Conservation (SLEEC) Annual Retreat, St. Louis, MO

2016: Wild Plant Pathosystems, Helsinki, Finland (poster)

2016: Ecological Society of America, Ft. Lauderdale, FL

2015: Ecological Society of America, Baltimore, MD

2014: Spatial Evolutionary Epidemiology, Montpellier, France (poster)
2014: Nordic Oikos, Stockholm, Sweden
2014: Experimental Evolution and Community Dynamics Symposium, Helsinki, Finland
2013: Ecological Society of America, Minneapolis, MN
2013: Ecology and Evolution of Infectious Disease, State College, PA (poster)
2012: Georgia Tech, School of Biology Retreat, Helen, GA
2012: Ecological Society of America, Portland, OR
2011: Ecological Society of America, Austin, TX
2010: American Society of Limnology and Oceanography, Santa Fe, NM (poster)
2009: Ecological Society of America, Albuquerque, NM

Public presentations

2026: Community Agriculture Conference hosted by Seed St. Louis, St. Louis, MO
2025: Education Research-Practice Partnerships Showcase, Washington University, St. Louis, MO
2025: Arts & Sciences Teaching Innovation Showcase, Washington University, St. Louis, MO
2025: Religion and Environment, Washington University, St. Louis, MO
2024: Washington University Center for the Environment poster session, St. Louis, MO (poster)
2023: Climate Change Speaker Series, Washington University, St. Louis, MO
2020: WashU Women in STEM, The Leading Women Research Symposium, St. Louis, MO

WORKING GROUP & SYMPOSIUM LEADERSHIP AND PARTICIPATION

2026: Organizer, Urban Biodiversity Symposium ("Making Saint Louis the Nature City of the 21st Century") at Missouri Botanical Garden
2026: Moderator, Urban Microclimate breakout session at Microclimate Ecology & Biogeography (MEB) General Assembly
2025–present: Co-lead, Living Earth Collaborative (LEC) working group on Urban Heat, Trees, and Green Infrastructure
2024: Organizer, Urban Biodiversity Symposium ("Making Saint Louis the Nature City of the 21st Century") at Missouri Botanical Garden
2023: Organizer, Urban Biodiversity Symposium at St. Louis Zoo
2021–present: Organizer, St. Louis Urban Ecology and Evolution (St. LUEE) Working Group
2021–present: Member, WashU Geospatial Working Group
2018–2021: Co-organizer, LEC working group on parasites and ecosystem nutrient cycling
2019: Co-organizer, St. Louis Plant-Microbe & Microbiome Meet-up Group

WORKSHOP PARTICIPATION

2018: British Ecological Society Spatial Statistics workshop, Glasgow, Scotland
2014: Spatial Evolutionary Epidemiology workshop, Montpellier, France
2011: Ecology and Evolution of Infectious Diseases modeling workshop, Santa Barbara, CA
2010: Enhancing Linkages between Math & Ecology workshop, Kellogg Biological Station, MI

SCIENTIFIC RESEARCH NETWORK INVOLVEMENT

Ecological Society of America section on Distributed Ecological Research Networks (DERN)
2026: Led successful initiative to start this new section
PlantPopNet globally distributed model system for population ecology, <https://www.plantpopnet.com/>
2022–Present: Steering committee member
2019–2022: Contributed annual census data from my lab's study site at Tyson Research Center
SoilTemp global database of soil and near-surface temperatures, <https://www.soiltempproject.com/>

2021–Present: Steering committee member

2020–2023: Contributed soil and air temperature data from sites across the St. Louis region BugNet global research network that aims to understand the impact of invertebrate herbivores and pathogenic fungi on plant communities and ecosystems, <https://bug-net.org/>

2021: Contributed data from grasslands at Tyson Research Center to a large comparative study HerbVar global research network that aims to understand why plant–herbivore interactions vary across the tree of life and around the world, <https://herbvar.org/>

2021: Contributed data from *Plantago* populations across the St. Louis (Missouri) region

TEACHING

Semester-long courses taught at Washington University (as course master)

BIOL 4195/5195 Disease Ecology, 4 credits, two 80-min lectures and 1-hour discussion sections each week (Spring semesters); teaching release granted in 2023 through “Provost Office Support for Tenure-Track Faculty in Response to COVID-19” program

Year	# Undergrads	# Grad students	Notes
2026	19	3	Third year of math modeling CURE
2025	25	1	Second year of math modeling CURE
2024	22	3	Debut of mathematical modeling Course-based Undergraduate Research Experience (CURE)
2022	24	1	
2021	20	2	
2020	24	6	
2019	18	3	New course; not previously offered at WashU

BIOL 5800 Seminar in Population Biology, 2 credits, required for all 1st and 2nd year graduate students in Ecology & Evolutionary Biology PhD program, class meets 2 hours each week for discussion of literature in Ecology & Evolutionary Biology (Fall semesters)

Year	# Grad students	Year	# Grad Students
2025	8	2020	12
2024	10	2019	11
2023	9	2018	7
2021	15		

Guest lectures taught while at Washington University

2022–2025: BEYOND 101 Earth's Future: Causes and Consequences of Global Climate Change, 30–78 undergraduates, 1 lecture per semester (Fall)

2018–2025: BIOL 181 First-Year Opportunity: Introduction to Cutting-Edge Research in Biology, 48-74 undergraduates, 1 lecture per semester (Fall)

2024: BIOL 343A Plants, People and the Environment, 12 undergraduates, 1 lecture (Spring)

2021–2023, 2025: BIOL 598 Topics in Ecology & Evolution, 3-9 graduate students, 1 lecture per semester (Fall)

2020: Fontbonne University, BIO 325 Disease Ecology, 14 undergraduates, 1 lecture (Fall)

2020: WashU COVID Course, The Pandemic: Science and Society, >1300 students, 1 lecture

2020: BIOL 3220 Woody Plants of Missouri, 10 students, 1 lecture (Spring)

2018: BIOL 524 Ecology & Environmental Science for K-12 Science Teachers at Tyson Research Center, 28 science teachers, 1 lecture and lab (Summer)

Advisor or evaluator for students' course-based projects at Washington University

2021–2024: ENST 405 Sustainability Exchange, expert evaluator for Sustainability Exchange Symposium (Spring 2021, Fall 2022, Fall 2024)

2023: BIOL 3010 Biotech Explorers Pathway, project advisor (Fall)

2018: MEMS 411 Mechanical Engineering Design Project, project mentor (Fall)

Teaching experience at University of Helsinki

2014: Course Co-Coordinator, Population Biology in Fragmented Landscapes (Fall)

MENTORSHIP AND TRAINING**Post-doctoral researchers mentored at Washington University**

Kaylee Arnold, Living Earth Collaborative Post-doc Fellow	Jan 2023–Present
Cedric Ndinga Muniania	Jan 2024–Dec 2024
Nina Fogel	June 2023–June 2024

PhD students mentored at Washington University in Ecology & Evolutionary Biology (EEB; formerly EEPB) and Plant & Microbial Biosciences (PMB) programs

Grace Coppinger, EEB, Danforth Plant Sciences Fellowship	2025–Present
Noah Clayton, EEB, Danforth Plant Sciences Fellowship, co-mentored with Jonathan Myers	2024–Present
Cheyenne Morris, PMB, Danforth Plant Sciences Fellowship and NSF Graduate Research Fellowship	2022–Present
Mahal Bugay, EEB, NSF Graduate Research Fellowship	2020–2026 (PhD)
Philippa Tanford, EEB	2019–2025 (PhD)
Quinn Fox, EEB	2020–2023 (PhD)
Rachel Becknell, EEPB, co-mentored with Scott Mangan	2019–2021 (PhD)

PhD rotation students mentored at Washington University

Akiva Zeff, EEB	Spring 2026
Elena Ochoa, PMB	Spring 2026
Hayley Sussman, PMB	Spring 2025
Grace Coppinger, EEB	Spring 2025
Noah Clayton, EEB	Spring 2024
Cheyenne Anderson, PMB	Spring 2022
Ryan Valdez, PMB	Spring 2020
Mahal Bugay, EEPB	Fall 2019
Quinn Fox, EEPB	Summer–Fall 2019
Philippa Tanford, EEPB	Spring–Summer 2019
David Henderson, EEPB	Fall 2018
Rhiannon Vargas, EEPB	Fall 2018

PhD thesis advisory committees at Washington University

Chloe Gehret, EEB	2025–Present
David Hernandez, EEB	2025–Present
Preston Pennington, EEB	2025–Present
Edith Lai, University of California, Santa Cruz (external member)	2025–Present
Lauren Johnson, EEB (Chair)	2023–Present
Katherine Benza, PMB	2023–Present

Antonio Brazelton, PMB (Chair)	2024–2026
Ethan Abercrombie, EEB	2022–2025
Anna Wassel, EEB	2022–2025
P. M. Shreenidhi, EEB	2024
Elizabeth Green, University of North Carolina at Chapel Hill (external member)	2020–2024
Rhiannon Vargas, EEB	2020–2024
Taylor Harris, PMB	2023
James Lucas Ojascastro, EEB	2018–2023
Kiona Elliott, PMB	2022–2023
David Henderson, EEB (Chair)	2020–2023
James Medina, EEPB	2022
Marshall Wedger, EEPB	2021–2022
Rachel Becknell, EEPB	2017–2021
Winston Anthony, WashU, Molecular Cell Biology	2018–2019
Christopher Catano, EEPB	2018–2019
Dilys Vela, EEPB	2018–2019
Holly Bernardo, EEPB	2018–2018

Qualifying exam committees at Washington University

Ting-Shuo Nien, PMB	Fall 2025
Edith Lai, University of California, Santa Cruz (external member)	Spring 2025
David Hernandez, Shiyang Wu, Maia Jones, Raymond Castillo, Chloe Gehret, & Binoshi Hettihewa, EEB	Spring 2025
Emmily Moses, PMB	Fall 2024
Magdalena Janik, PMB	Fall 2023
Calum Stephenson & Lauren Johnson, EEB	Spring 2023
Jia Gwee, PMB	Fall 2022
Anna Wassel, EEB	Spring 2022
Elizabeth Green, University of North Carolina at Chapel Hill (external member)	Fall 2021
Emma Frawley, EEPB	Spring 2021
David Henderson & Rhiannon Vargas, EEPB	Spring 2020
P. M. Shreenidhi, EEPB	Spring 2019
James Lucas & James Medina, EEPB	Fall 2018

Undergraduate students mentored at Washington University

Anisah Dowell, WashU	2025–Present
Jacqueline Conde Sanluis, WashU	2024–Present
Elizabeth Grieve, WashU	2024–Present
Brooklyn Burch, Pomona College	Summer 2026
Auriel Prepejchal, WashU	2025–2026
Ashley Lugo Huerta, WashU	2023–2026
Anna Tourney, WashU	2023–2026
Pranishtha Upadhyaya, Webster University	Summer 2025
Aurora Fang, WashU	2024–2025
Sophie Tian, WashU	2024–2025
Vy Nguyen, WashU	2024–2025
Ruth Workineh, WashU	2024–2025
Josie Kearns, Brandeis University	Summer 2024
Chiara Schilten, University of Dayton	Summer 2024

Olivia Resa, WashU	Summer 2024
Alexis Hernandez, WashU	Summer 2024
Shaza Ali, WashU	2023–2024
Serena Fankhauser, WashU	2023–2024
Maddie Rhodes, Cornell	2023–2024
Zee Zee Covington, WashU	2023–2024
Samantha Lyerla, Bellarmine	Summer 2023
Fares Noueir, Lake Forest College	Summer 2023
Shawn Zhu, WashU	Summer 2023
Alana Herr, WashU	2022–2024
Allison Rea, WashU	2022–2024
Sam Ko, WashU	2022–2023
Lily Goldberg, WashU	2022–2023
Annika Fischer, Harris-Stowe State University	Summer 2022
Kylee Kest, WashU	Summer 2022
Jaimie Lin, WashU	2021–2024
Emma Snyder, WashU	2021–2023
Emma Glickert, WashU	2021–2022
Avery McCammon, WashU	Summer 2021
Lawton Blanchard, WashU	Summer 2021
Rida Qureshi, WashU	Spring 2021
Aaron Morris, WashU	Spring 2021
Keiko Farah, WashU	2020–2023
Olivia Shaw, WashU	Summer–Fall 2020
Joshua Helle, Lawrence University	Summer 2020
Michelle Pollowitz, WashU	2020–2021
Armando Sánchez-Conde, WashU	2019–2021
Selaam Dollisso, WashU	2019–2020
Taewon Lee, WashU	2019–2020
Eleanor (Elly) Grant, WashU	2019–2020
Emma Waltman, WashU	2019–2020
Akosua Sarfo, WashU	2019–2020
Laura Goh, WashU	Summer 2019
Jack Steffy, WashU	Spring 2019
Imani Jones, WashU	2018–2020
Sabrina Talir, Mount Holyoke	2018–2020
Arjun Puri, WashU	Summer 2018
Sheena Stevens, University of Missouri - St. Louis	Summer 2018
Rachel Fan, WashU	2017–2019
Austin Chen, WashU	2017–2020

Undergraduate senior theses supervised at Washington University

- 2026: Elizabeth Grieve, “A novel method for fungal plant pathogen infection and applications in lifecycle thermal performance measurement”
- 2026: Golde Umlas, “Environmental stress and soil microbial communities impact the performance of native and introduced species of Plantago” (co-mentor: Jonathan Myers)
- 2024: Allison Rea, "Effects of heat stress on plant susceptibility to fungal infection"
- 2023: Lily Goldberg, "Total pathogen growth under coinfection reflects differential growth rates of individual pathogens"

2021: Michelle Pollowitz, "Microhabitat factors affect plant disease in urban and suburban ecosystems"
 2020: Eleanor Grant, "Effects of disease and mowing on growth and reproduction of two *Plantago* species"

Undergraduate senior thesis committees at Washington University

2026: Marilee Karinshak, "How Climate Shapes the Distribution of *Aphis glycines*: Modeling Past, Present, and Future Range Dynamics", Environmental Studies
 2024: Randy Hartmann, "Barriers to Belonging: Investigating the perspectives of trans and gender non-conforming individuals during field research experiences", Environmental Studies

High school students mentored at Washington University

Katy Arterburn & Abby Assouad	Summer 2025
Avani Reddy & Adrian Woods	Summer 2024
Ella Marks & Zoey Ziegler	Summer 2023
Maddie Rhodes	Summer–Fall 2022
Hanna Jachna	Summer 2022
Jacob Cummings & Fyle Fyle	Summer 2021
Bernadette Bergman, Vlada Gladun, & Kate Pogue	Summer 2019

Undergraduate students mentored at previous institutions

Manika Luhano, UW-Madison	2016–2017
Suvi Sallinen, University of Helsinki, undergrad & M.Sc. research	2014–2016
Brian Lemanski, Colgate University, NSF REU Program at Georgia Tech	Summer 2012
Alison Burger, Georgia Tech	Spring 2011
Hema Sundar, Georgia Tech	2011–2012
Abigail Reynolds, Georgia Tech	2009–2010
Grace Wilkinson, St. Olaf College, NSF REU Program at Georgia Tech	Summer 2009

PROFESSIONAL SERVICE

Reviewer for journals: *American Naturalist*, *BMC Ecology*, *Communications Biology*, *EcoHealth*, *Ecology*, *Ecology and Evolution*, *Ecology Letters*, *Environmental Microbiology*, *Evolution*, *Evolutionary Applications*, *Food Webs*, *Freshwater Biology*, *Hydrobiologia*, *Journal of Animal Ecology*, *Journal of Ecology*, *Limnology & Oceanography*, *Molecular Ecology*, *Nature Communications*, *Nature Ecology & Evolution*, *New Phytologist*, *Oecologia*, *Oikos*, *Parasitology*, *Plant Health Instructor*, *PLoS ONE*, *PLoS Pathogens*, *PNAS*, *Proceedings B*, *Trends in Ecology & Evolution*

Number of manuscripts peer-reviewed: 2011 (4), 2012 (3), 2013 (2), 2014 (1), 2015 (9), 2016 (4), 2017 (1), 2018 (4), 2019 (8), 2020 (6), 2021 (4), 2022 (2), 2023 (7), 2024 (11), 2025 (6)

Subject-Matter Editor at *Ecology* (Jan 2025–Present)

Guest Subject-Matter Editor at *Ecology* (Sept–Dec 2024)

Guest Editor for theme issue of *Philosophical Transactions of the Royal Society B* on "Wild plant pathosystems" (2025–2026)

Advisor for F1000 journal collection "Coevolution in a Rapidly Changing World" (2023–2024)

Reviewer of grant proposals for funding agencies: National Science Foundation (ad hoc reviews as well as panelist for NSF BIO programs in 2019 & 2023), European Research Council (ad hoc), ANR French National Agency for Research (ad hoc), and Austrian Science Fund (ad hoc)

Number of grant proposals reviewed: 2016 (1), 2017 (2), 2019 (11), 2023 (8), 2024 (2)

Number of unique letters of recommendation or nomination written: 2018 (5), 2019 (14), 2020 (20), 2021 (16), 2022 (19), 2023 (10), 2024 (18), 2025 (17)

SERVICE TO ST. LOUIS AREA SCIENCE COMMUNITY

Faculty sponsor for St. Louis chapter (est. 2021) of Ecological Society of America Strategies for Ecology Education, Diversity and Sustainability (ESA SEEDS) program (2021–Present)

Panelist for "Research Data Stories: Unique Challenges and Common Goals Working With Data in the Social Sciences, Humanities, and Life Sciences" event during Love Data Week hosted by Becker Medical Library, WashU Libraries, and Institute for Informatics, Data Science & Biostatistics (2/14/2024)

Panelist for BioBash career fair discussion at Donald Danforth Plant Science Center (9/15/2022)

SERVICE AT WASHINGTON UNIVERSITY

Faculty Libraries Council (FLC)

Arts & Sciences Natural Sciences/Mathematics faculty representative to FLC (7/2025–6/2028)

Department of Biology

Biology Inclusion Committee:

Biology Inclusion Committee, Chair (Fall 2023–Present)

Biology Inclusion Committee, Member (2019–2023)

Organizer/Moderator, "COVID-19 & the WashU Community" panel discussion (03/2020)

Organizer, seminar and discussion on "Mental Health Disparities for BIPOC" (12/2020)

Hiring committees:

Greenhouse Manager Search Committee (Fall 2023)

Faculty Search Committee (Kemper Chair in plant biology; 2023–2024)

Faculty Search Committee (urban biology; 2021–2022)

Biology and Environmental Biology majors:

Environmental Biology Major Curriculum Committee (2020–Present)

Environmental Biology Major Steering Committee (2017–Present)

Mentor for undergraduate researchers in BIOL 200/500 (2017–Present)

Advisor for Biology and Environmental Biology Majors (2018–Present):

Year	# Biology advisees	# Env. Biol. advisees	Year	# Biology advisees	# Env. Biol. advisees
2025-2026	9	11	2021-2022	10	5
2024-2025	12	4	2020-2021	6	9
2023-2024	15	7	2019-2020	3	11
2022-2023	11	5	2018-2019	3	5

Greenhouse Committee, Member (Spring 2024–Present)

Reviewer of Biology Department's Danforth Endowment Seed Grants (2025)

Student awards committees and judging activities:

Spector & Quatrano Award Committee (2019–Present)

Judge for BioSURF applications (Spring 2019)

Judge for Marian Smith Spector Prize for Undergraduate Senior Honors Thesis (Spring 2018)

Division of Biology & Biomedical Sciences (DBBS)

Student Support Committee (Spring 2023)

Ecology & Evolutionary Biology (EEB) program within DBBS

EEB transition out of DBBS committee (2025)

EEB Faculty Advisor for First-Year Students (2022–Present)

EEB Admissions Committee (2017–Present)

EEB Steering Committee (2017–Present)

EEB Qualifying Exam Committee (2018–2019; 2025)

Plant & Microbial Biosciences (PMB) Program within DBBS

PMB Steering Committee (Oct 2024–Present)

Interviewer for PMB PhD applicants (2019–Present)

PMB Breakfast Faculty Presentation (Fall 2018)

Tyson Research Center

Mentor for summer undergraduate research fellows ("Plant Disease Team"): 2018 (4 students), 2019 (4 students), 2020 (3 students), 2021 (2 students), 2022 (4 students), 2023 (4 students), 2024 (5 students), 2025 (3 students)

Mentor for Tyson student poster presentations at WashU Undergraduate Research Symposium:

Fall 2018 (1 poster), Fall 2019 (4 posters), Fall 2020 (1 poster), Fall 2021 (1 poster)

Panelist on career panel for undergraduate & high school students (7/26/2018)

Participant in annual undergraduate recruitment events (2017–Present)

Living Earth Collaborative (LEC)

LEC 2.0 Urban Biodiversity working group (2023–Present)

LEC Postdoctoral Fellowship Selection Committee (Fall 2018)

Center for the Environment

Interviewer for Research Development Associate position (Fall 2024)

Environmental Studies Program

Search committee for Lecturer in One Health (Fall 2024)

Additional interdisciplinary affiliations at Washington University

Center for the Environment Scholar

Environmental Studies affiliated faculty member

Living Earth Collaborative Biodiversity Fellow

Taylor Geospatial Institute Associate

Alumni engagement

Panelist for interdisciplinary conversation titled, "Environment, Sustainability, and Climate Change Panel with WashU Experts" for audience of WashU alumni during reunion weekend (4/20/2024)

OUTREACH ACTIVITIES AT WASHINGTON UNIVERSITY

Partnership with the School District of University City (SDUC) in University City, MO

2026: Production of 8-minute video introducing our lab's research to K-12 audience, co-developed with SDUC teachers and the WashU Institute for School Partnership

2025: Co-learning and co-development of instructional resources with three teachers, facilitated by WashU Institute for School Partnership (began 6/2025). Presented poster about this partnership at Ecological Society of America annual meeting (8/2025; Baltimore MD), with teachers as co-authors on poster.

2025: Presented research to 5th grade classes at Jackson Park Elementary (5/6/2025).
 2024–Present: Member of Agriculture Advisory Committee for Agricultural Career Pathway at University City High School.
 2024: Established a new set of plant health experiments in same sites as 2023.
 2024: Engaged multiple classes at Jackson Park Elementary (grades 4-5) in removal and biomass collection of overwintered plants (5/17/2024).
 2023: Implemented updated PlantSTEM curriculum in classes at Brittany Woods Middle School (9/19/2023, 9/22/2023) and Jackson Park Elementary (10/6/2023). Presented information about our experiment and high school research internships to Environmental Club at University City High School (11/8/2023).
 2023: Established a new set of replicated plant health experiments embedded in gardens at three SDUC schools (Jackson Park Elementary, Brittany Woods Middle School, & University City High School), two urban community gardens (Clay Community Garden and Claver House garden), and two rural sites (Tyson Research Center and Shaw Nature Reserve).
 2022: Developed "PlantSTEM" curriculum aligned to science standards for grades K-8 for implementation in our garden experiments. Led in-person data collection with kindergarten classes at Jackson Park Elementary (10/11/2022).
 2022: Established replicated experiments in gardens of five SDUC schools and three other sites, testing effects of environmental factors on growth and disease of *Plantago* plants.
 2022–Present: Judge for SDUC Science Fair projects (annually in spring).

Led interactive plant science activities and info booth at public events in St. Louis region

UCity STEAM Expo (each November 2022–2025); University City, MO
 UCity Growing Together Food Garden events (each May 2022–2025); University City, MO
 Market Fresh Science at Ferguson Farmers Market (9/7/2019); Ferguson, MO

SERVICE AND OUTREACH ACTIVITIES AT PREVIOUS INSTITUTIONS

Outreach at University of Wisconsin-Madison

Guest Scientist, Junior Science Café, led science career discussions and activities with 5-7th graders (3 x 1.5-hr sessions, Spring 2017)
 Workshop Leader, ‘College for Kids’ limnology workshop for 6th graders (3 wks, Summer 2008)

Outreach at University of Helsinki

Activity Leader, ‘Tiede Tulee Tarhaan’ (‘Science Goes Kindergarten’) biology workshop for kindergarteners (2-3 days each in Fall 2013, 2014, and 2015)

Service and Outreach at Georgia Tech

Judge for Georgia Tech Undergraduate Research Spring Symposium (2013)
 School of Biology Scientific Retreat Planning Committee (2010)
 Co-President, Biology Graduate Student Association (2010)
 Activity Leader, ‘Plankton Day’ at Piedmont Park Summer Camp. Led urban aquatic ecology activities for children ages 5-11 (1 day, Summer 2009, 2010, 2011)
 Guest Scientist, 5th grade class, Warren T. Jackson Elementary School. Led plankton identification activities and discussions about freshwater ecosystems (1 day, Fall 2008)
 Guest Scientist, I.B. biology class, Marietta High School. Gave short lectures and guided students in designing urban aquatic ecology group projects (1 day, Spring 2011 and 2013)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Phytopathological Society (since 2017)
Ecological Society of America (since 2008)

AWARDS AND FELLOWSHIPS RECEIVED BY TRAINEES IN MY RESEARCH GROUP

2025: Carrie Goodson, Research Excellence Staff Recognition
2025: Grace Coppinger, William H. Danforth Plant Sciences Fellowship
2025: Elizabeth Grieve, Summer Undergraduate Research Guided Experience (SURGE) program
2025: Noah Clayton, Bo Koster Grant for Nature Study
2024: Noah Clayton, William H. Danforth Plant Sciences Fellowship
2024: Kaylee Arnold, Maya Angelou Award for Postdoctoral Excellence in Leadership
2023: Mahal Bugay, George Hayward Plant Biology Graduate Fellowship
2023: Cheyenne Morris, National Science Foundation Graduate Research Fellowship
2022: Cheyenne Morris, William H. Danforth Plant Sciences Fellowship
2022: Kaylee Arnold, Living Earth Collaborative Postdoctoral Fellowship
2021: Mahal Bugay, National Science Foundation Graduate Research Fellowship
2020: Quinn Fox, Morris B. Rettner Scholarship
2020: Mahal Bugay, Ecological Society of America Strategies for Ecology Education, Diversity and Sustainability (ESA SEEDS) travel award
2019: Philippa Tanford, Howard A. Schneiderman Graduate Fellowship